

Docket No.: AB-122U

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

**Claim 1 (currently amended): A multichannel deep brain stimulation system (10) comprising:**

an implantable pulse generator (20) having means for generating electrical stimuli comprising a plurality of channels and memory circuits, wherein the memory circuits store at least one program and data;

at least one electrode array (30) connected to said implantable pulse generator, said at least one electrode array having a plurality of electrodes (32);

a rechargeable battery (27) coupled to the implantable pulse generator;

a hand-held programmer (50); and

a clinician's programmer (60);

a manufacturing and diagnostic system (70); and

an external battery charging system (40);

wherein the implantable pulse generator (20) and said at least one electrode array (30) are adapted to be implanted directly in the cranium of a patient; and

wherein the means for generating electrical stimuli comprises control circuits (21, 26, 27) and the memory circuits (22, 24) that cause stimulation pulses having parameters specified only by the at least one program and data stored in the memory circuits to be applied through at least one of the plurality of channels to the electrodes (32) of the at least one electrode array in accordance with the at least one program stored within the memory circuits; and

wherein the hand-held programmer (50) is adapted to: communicate with the implantable pulse generator, allow the patient to monitor and change stimulation parameters, provide a first communication link (46) with the clinician's programmer, and provide a second communication link (47) with the manufacturing and diagnostic system, all for the purpose of programming and testing the implantable pulse generator

Docket No.: AB-122U

(20); and

wherein the external battery charging system (40) is adapted to be inductively coupled to the rechargeable battery (27) for the purpose of replenishing the power stored within the rechargeable battery.

Claim 2 (currently amended): The deep brain stimulation system of Claim 1 wherein the further including a manufacturing and diagnostic system further includes (70), the manufacturing and diagnostic system including means for coupling with the implantable pulse generator (20) via RF communication.

Claim 3 (currently amended): The deep brain stimulation system of Claim 2 wherein the second communication link between the manufacturing and diagnostic system (70) and the hand held programmer comprises an infra-red communication link further includes means for coupling with the hand held programmer (50) via infra-red communication.

Claim 4 (previously presented): The deep brain stimulation system of Claim 1 wherein said at least one electrode array comprises at least two electrode arrays (30, 30'), thereby facilitating bilateral stimulation of the brain of the patient.

Claim 5 (original): The deep brain stimulation system of Claim 5 wherein each of the electrode arrays (30 and 30') includes at least two and as many as sixteen electrodes (32, 32').

Claim 6 (currently amended): The deep brain stimulation system of Claim 1 wherein the first communication link between the further including a clinician programmer (60), and wherein the clinician programmer (60) may be coupled to the hand-held programmer comprises an (50) via infra-red communication link for the purpose of coupling the clinician programmer with the implantable pulse generator (20).

Docket No.: AB-122U

**Claim 7 (currently amended):** The deep brain stimulation system of Claim 1 wherein the implantable pulse generator comprises a header connector (22), and wherein the at least one electrode array (30) is detachably connected to the implantable pulse generator (20) through the header connector (22).

**Claim 8 (currently amended):** The deep brain stimulation system of Claim 7 wherein the implantable pulse generator includes comprises an output circuit (25), and wherein the at least one electrode array (30) is capacitively coupled to the output circuit (25) of the implantable pulse generator.

**Claim 9 (currently amended):** A multichannel bilateral deep brain stimulation system (10) comprising:

an implantable pulse generator (20);

a plurality of electrode arrays (30, 30'), each of said plurality of electrode arrays having a plurality of electrodes (32) thereon, and each of said plurality of electrode arrays being detachably connected to said implantable pulse generator;

processing means (21, 26, 27) and memory means (22, 24) included within the implantable pulse generator, the memory means comprising memory circuitry wherein at least one stimulation program and data are stored, wherein the implantable pulse generator is adapted to generate and apply stimulation pulses to selected electrodes (32) of the plurality of electrode arrays as defined only by the at least one stimulation program and data stored within the memory means;

a hand held programmer (50);

a clinician programmer (60);

a manufacturing and diagnostic system (70);

a rechargeable battery (27) included within the implantable pulse generator that provides operating power for the implantable pulse generator;

means (50) for non-invasively programming the memory circuitry means with the desired at least one stimulation program and data; and

Docket No.: AB-122U

means for providing a first radio frequency (RF) communication link between the implantable pulse generator and the hand held programmer;  
means for providing a first infra red communication link between the hand held programmer and the clinician programmer;  
means for providing a second infra red communication link between the hand held programmer and the manufacturing and diagnostic system;  
means for providing a second RF communication link between the implantable pulse generator and the manufacturing and diagnostic system; and  
means (40) for non-invasively recharging the rechargeable battery;  
wherein the hand held programmer includes means for allowing the patient to monitor and change the control data, and further facilitates communications between the clinician's programmer, the manufacturing and diagnostic system and the implantable pulse generator.

Claims 10-11 (canceled).

Claim 12 (previously presented): The deep brain stimulation system of Claim 9 wherein each of the electrode arrays (30, 30') includes at least two and as many as sixteen electrodes (32, 32').

Claim 13 (previously presented): The deep brain stimulation system of Claim 9 further including a clinician programmer (60) and a hand-held programmer.

Claim 14 (canceled).

Claim 15 (previously presented): The deep brain stimulation system of Claim 1 wherein the implantable pulse generator comprises a header connector (22), and wherein each of said plurality of electrode arrays is detachably connected to the implantable pulse generator (20) through the header connector (22).

Docket No.: AB-122U

Claim 16 (currently amended): The deep brain stimulation system of Claim 15 wherein the implantable pulse generator includes comprises an output circuit (25), and wherein the at least one electrode array (30) is capacitively coupled to the output circuit (25) of the implantable pulse generator.

Claim 17 (currently amended): A multichannel deep brain stimulation system comprising:

a cranium mountable implantable pulse generator including at least one memory circuit;

data stored within the at least one memory circuit;

at least one electrode array adapted to be detachably connected to the implantable pulse generator, the at least one electrode array including two or more electrodes thereon;

a rechargeable battery coupled to the implantable pulse generator;

an external battery charging system;

a hand held programmer;

a clinician's programmer;

a manufacturing and diagnostic system;

wherein the implantable pulse generator includes means for generating is adapted to generate electrical pulses that are defined by parameters specified only by the data stored in the at least one memory circuit

wherein the hand held programmer includes means for communicating with the implantable pulse generator, and further includes means for allowing a patient to monitor and program at least some of the data stored in the at least one memory circuit;

wherein the hand held programmer further includes means for communicating with the clinician's programmer, whereby an operator of the clinician's programmer communicates with and programs the implantable pulse generator through an interface provided by the hand held programmer; and

Docket No.: AB-122U

wherein the hand held programmer also includes means for communicating with the manufacturing and diagnostic system, whereby a user of the manufacturing and diagnostic system monitors and communicates with the implantable pulse generator through an interface provided by the hand held programmer.

Claim 18 (canceled).

Claim 19 (previously presented): The system of Claim 17

    wherein the implantable pulse generator includes at least two channels,  
    wherein the two or more electrodes of the at least one electrode array are  
    adapted to be assigned to any of the at least two channels, and  
    wherein each of the at least two channels is adapted to define a common  
    frequency and pulse duration for the two or more electrodes when such electrodes are  
    assigned to an associated channel.

Claim 20 (canceled).